Philip & Russell

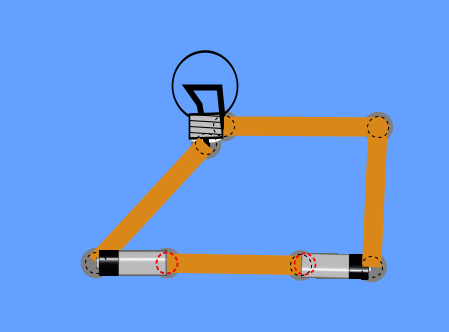
Chapter 22/23 Electricity Worksheet

**22.3- Basic Circuit Information**

* An electrical circuit is a closed loop or pathway that allows for electrons to flow. For electrons to flow there needs to be a conductor (such as a wire) connecting two places and a potential difference between them.
* There are three types of circuits:
  + An **open circuit** is a circuit in which charges **do not** flow
  + A **closed circuit** is a circuit in which charges **can** flow
  + A **short circuit** is a circuit in which one side of the power source is connected directly to the other without any resistance in between
* An example of a circuit is a light bulb. For a light bulb to light, you need a path for charges to flow from one end of the battery through the filament of the bulb to the other end of the battery.

**Example Problem #1**

Will the light bulb in the following picture light?



**No because the polarities of the batteries are opposite so electrons do not have a path to flow through.**

**22.4 Resistance and the differences between resistances in series and parallel circuits**

* **Resistors** are devices that oppose the flow of electrons in a circuit. **Resistance** is measured in **ohms** (Ω)
* In a **series circuit**, electrons only have one path to follow. The equation for finding the total resistance in a series circuit is:
* In a **parallel circuit**, electrons have multiple paths to follow. The equation for finding the total resistance in a parallel circuit is:

**22.5 Ohm’s Law**

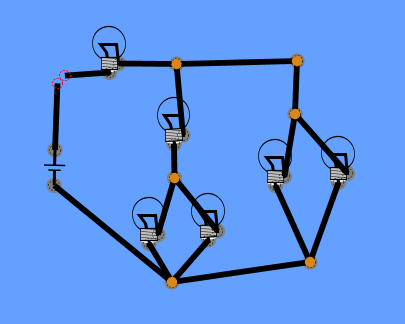
* **Current** or “I” is the flow of charge. It is measured in Amperes (A)
* The relationship between resistance, current, and voltage is as follows and is known as **Ohm’s Law**:

**22.12 Predicting the brightness/dimness of a circuit**

* The brightness of a light bulb is directly related to the square of the current. More current means brighter bulb
* In series, when you add more bulbs the brightness of each bulb goes down because the current is going down
* In parallel, when you add more bulbs the brightness of each bulb stays the same because you are adding more branches that have the same current

**Example Problem #2**

Which bulb(s) is/are the dimmest?

****

6

5

2

1

4

3

**Bulbs 3&4 will be the dimmest because they are in series with another bulb. This means that the current of the whole branch decreases.**

**Extra Resources:**

Phet labs such as the circuit construction kit <http://phet.colorado.edu/en/simulation/circuit-construction-kit-ac>

<http://www.physicsclassroom.com/Class/circuits/> (Concept review)

<http://physics.bu.edu/py106/notes/Circuits.html> (series vs parallel review)